479.
Title: Surface and magnetic polaritons on two-dimensional nanoslab-aligned multilayer structure
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Abstract: The present study theoretically investigates the radiative properties of a two-dimensional (2-D) multilayer structure that has a dielectric spacer between a metallic substrate and square cross-sectional metallic gratings. Differently from the one-dimensional metallic strips coated on a dielectric spacer atop an opaque metallic film [Opt. Express 16, 11328 (2008)], the 2-D metallic gratings can support the localized surface plasmon in addition to the propagating surface plasmon along the metal-dielectric interface. Moreover, the presence of a dielectric spacer also allows the excitation of magnetic polaritons. Underlying mechanisms of the surface and magnetic polartions on the proposed structure are elucidated by employing the 2-D rigorous coupled-wave analysis. The results obtained in this study will advance our fundamental understanding of light-matter interaction at the nanometer scale and will facilitate the development of engineered nanostructures for real-world applications, such as thermophotovoltaic and photovoltaic devices.